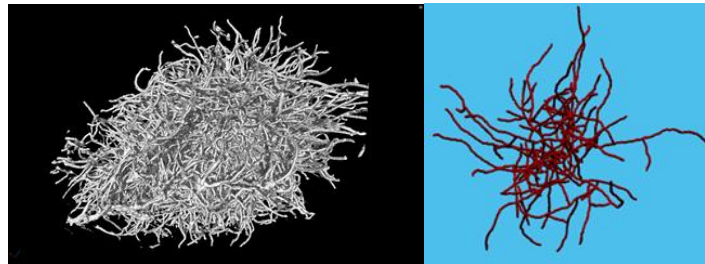


Master thesis

# Investigation of hyphal distribution in simulated fungal pellets generated with different growth parameters.



## Motivation

Filamentous microorganisms play a central role in biotechnology and the circular economy, producing organic acids, enzymes, life-saving antibiotics and drugs. Furthermore, they can drive the transition from our petroleum-based economy to a bio-based circular economy. However, for optimal benefit, the processes need to be better understood. The growth forms (morphology) of the microorganisms during cultivation have a great influence on the required power input and product yield. In our chair it was possible for the first time to study the microstructure (micromorphology) of filamentous fungi by using microtomography measurements of a large number of fungal structures (done by Henri Müller). With the help of mathematical models, it is possible to understand influencing factors and predict the outcome of cultivation.

## Work Objectives

You will use (and possibly modify) a stochastic structure model to simulate random fungal structures. The aim is to understand the influence of growth parameters on the hyphae density distribution in a single pellet.

The thesis can be written in **German** or **English**.

**Matlab** basics are useful but not required.

## Technische Universität München

Lehrstuhl für Systemverfahrenstechnik  
Charlotte Deffur  
Gregor-Mendel-Straße 4, 85354 Freising  
charlotte.deffur@tum.de